

CLAIMS

1. A mini-fan that comprises a fan wheel (64) equipped with fan blades (80), and an electrical drive motor (61) for driving that fan wheel, which drive motor (61) comprises a permanent-magnet external rotor (62) and an internal stator (90), which latter is implemented as a stator having sheet-metal parts (88, 110), and the fan blades (80) are provided on the fan wheel (64).

2. The mini-fan according to claim 1,

wherein the stator is implemented as an internal stator having pole pieces (88, 110) whose claw poles (84, 86) engage into one another, there being arranged between the pole pieces a coil former (57) that comprises a central portion (54) to which are joined two side parts (50, 56), located opposite one another, one of which is implemented as a carrier for electrical elements (96, 98) of the motor (61), the carrier (50) being equipped in particular with orifices (122, 124) for passage of the claw poles of the pole piece (110) adjacent to it.

3. The mini-fan according to claim 2,

wherein at least the pole piece (110) adjacent to the carrier (50) is equipped at least locally with a plastic part (114, 116) that is fixedly joined to the carrier (50).

4. The mini-fan according to claim 3,

wherein the plastic part (114, 116) extends in the region between two adjacent claw poles (84, 86).

5. The mini-fan according to claim 3 or 4,

wherein the plastic part (114, 116) is equipped, on its side adjacent to the carrier (50), with a projection, in particular a rib (120), which projection is welded to the carrier (50).

6. The mini-fan according to one of claims 3 to 5,
wherein the plastic part (114, 116) extends at least partially
over a claw pole (84, 86).

7. The mini-fan according to claim 6,
wherein a claw pole (84, 86) is equipped with recesses (126)
in which the plastic of the plastic part (114, 116) is anchored.

8. The mini-fan according to one of claims 2 to 7,
wherein a tube (52) made of soft ferromagnetic material is
arranged inside the coil former (57).

9. The mini-fan according to claim 8,
wherein the tube (52) is implemented as a magnetic return
piece for the pole surface (88, 110).

10. The mini-fan according to claim 8 or 9,
wherein the tube (52) is equipped, in the region of the
carrier, with at least one recess that extends over a portion of the
tube periphery and through which the plastic of the coil former (57)
extends into the interior of the tube (52).

11. The mini-fan according to claim 10,
wherein the plastic that extends into the interior of the tube
(52) is implemented as part of an axial bearing for journaling the
permanent-magnet external rotor (62).

12. The mini-fan according to one of the preceding claims,
wherein a sealing ring (24) made of sponge rubber is provided
in the region of the air inlet opening (14).

13. The mini-fan according to claim 12,
wherein the sealing ring (24) is arranged on a circuit board
(22) that is provided in the region of the air inlet opening (14).

14. The mini-fan according to claim 13,
wherein a temperature sensor (28) is arranged on the circuit
board (22).

15. The mini-fan according to claim 14,
wherein the circuit board (22) comprises a strut (26) that
extends in the region of the air inlet opening (14) and serves as a
carrier for the temperature sensor (28).

16. The mini-fan according to one of the preceding claims,
wherein a temperature sensor (28) is provided; and the
conductors (140, 142) leading to the temperature sensor (28) are
applied onto the fan housing (144) using the hot-stamping method.

17. The mini-fan according to one of the preceding claims,
wherein the fan blades (80) extend substantially parallel to
the rotation axis (82) of the mini-fan.

18. The mini-fan according to one of the preceding claims,
which comprises a substantially cylindrical external housing (20;
220) having an axial air inlet opening (14) and at least one lateral
air outlet opening (16).

19. The mini-fan according to one of the preceding claims,
which is equipped with mounting feet (53; 36', 38') that also serve
at least in part for electrical connection of the fan.

20. The mini-fan according to one of the preceding claims,
wherein a two-phase stator winding (58) that is wound in
bifilar fashion is provided on the coil former (57).

21. The mini-fan according to one of the preceding claims,
wherein a housing part (212), in which at least one permanent
magnet (226, 228) is mounted by plastic injection molding, is
provided in a region in the vicinity of the rotor (62).

22. The mini-fan according to claim 21,
wherein the permanent magnet is implemented as
a plastic-matrix flexible magnet (226, 228).